What is claimed is:

1. (AMENDED) A method of controlling [the] a gray scale of a plasma display device, wherein said method comprises the steps of:

forming a frame for an image by a plurality of subframes each having a specific weight value;

calculating numbers of sustain emissions of said plurality of subframes so as to make a ratio of brightnesses of said plurality of subframes [so as to] substantially correspond with a ratio of the specific weight values of said plurality of subframes, wherein a ratio of numbers of sustain emissions of said plurality of subframes does not equal the ratio of the specific weight values of said plurality of subframes; and

displaying the image on said plasma display device by optionally combining said subframes each having the calculated number of the sustain emissions.

2. (AMENDED) A method of controlling [the] a gray scale of a plasma display device as claimed in claim 1, wherein the number of sustain emissions of said each subframe is so calculated, that the brightness obtained by one subframe of said plurality of subframes having an arbitrary brightness is twice the brightness obtained by another subframe of said plurality of subframes having a brightness next to that of said one subframe.

3. (AMENDED) A plasma display device comprising at least one pair of electrodes for carrying out a discharge operation, wherein:

said plasma display device is driven by separating address periods in which display data are written in a common period for each display line in the screen[, said display data is] so as to accumulate wall charges necessary for sustain discharge from sustain discharge periods in which sustain discharge for light emission is repeated in a common period for each display line, one frame forming an image is constituted by a plurality of subframes each having a specific weight value, numbers of sustain emissions of said plurality of subframes are calculated so as to make a ratio of brightnesses of said plurality of subframes [is calculated so as to] substantially correspond with a ratio of the specific weight values of said plurality of subframes, wherein a ratio of numbers of sustain emissions of said plurality of subframes does not equal to the ratio of the specific weight values of said plurality of subframes, and the image is displayed on said plasma display device by optionally combining said subframes each having the calculated number of the sustain emissions.

4. A plasma display device as claimed in claim 3, wherein said plasma display device is a three-electrode plasma display device.

5. A plasma display device as claimed in claim 4, wherein said three-electrode plasma display device is a three-electrode surface discharge AC plasma display device.

6. A plasma display device as claimed in claim 4, wherein said three-electrode plasma display device comprises:

first and second electrodes arranged in parallel with each other; and

third electrodes orthogonal to said first and second electrodes, said first electrode being commonly connected together, and said second electrodes being arranged for display lines, respectively, wherein said display device has a surface discharge structure employing wall changes as memory media.

7. A plasma display device as claimed in claim 6, wherein said three-electrode plasma display device further comprises:

a first substrate, and said first and second electrodes being arranged in parallel with each other on said first substrate and paired for respective display lines;

a second substrate spaced apart from and facing said first substrate, and said third electrodes being arranged on said second substrate away from and orthogonal to said first and second electrodes;

a wall charge accumulating dielectric layer covering the surfaces of said first and second electrodes and said first substrate;

a phosphor formed over said third electrodes and said second substrate;

a discharge gas sealed in a cavity defined between said first and second substrates; and

cells formed at intersections where said first and second electrodes cross said third electrodes.

8. A plasma display device as claimed in claim 3, wherein said plasma display device is a two-electrode plasma display device.

9. A plasma display device as claimed in claim 8, wherein said two-electrode plasma display device is a two-electrode facing-discharge AC-driven plasma display panel.

10. A plasma display device as claimed in claim 8, wherein said two-electrode plasma display device comprises:

a plurality of first electrodes; and

a plurality of second electrodes orthogonal to said first electrodes, and said first electrodes being arranged for display lines, respectively wherein said display device has a surface discharge structure employing wall charges as memory media.

11. A plasma display device as claimed in claim 10, wherein said two-electrode plasma display device further comprises:

a first substrate, and said first electrodes being arranged in parallel on said first substrate;

a second substrate spaced apart from and facing said first substrate, and said second electrodes being arranged on said second substrate away from and orthogonal to said first electrodes;

a wall charge accumulating dielectric layer covering the surfaces of said first electrodes and said first substrate;

a phosphor formed over said second electrodes and said second substrate;

a discharge gas sealed in a cavity defined between said first and second substrates; and

cells formed at intersections where said first electrodes cross said second electrodes.

12. A plasma display device as claimed in claim 3, wherein said plasma display device further comprises a memory for setting and storing the number of sustain emissions in each subframe, and information on the number of sustain emissions in said each subframe is read at any time from said memory.

13. A plasma display device as claimed in claim 12, wherein said memory is constituted by a vacant area of a driving wave-form memory device in said plasma display device, and the information on the number of sustain emissions in said each subframe is set in the vacant area of said driving wave-form memory device.

14. A plasma display device as claimed in claim 12, wherein said plasma display device further comprises a brightness controller for adjusting the brightness, and said brightness controller selects one piece from the information on the number of sustain emissions in each said subframe set in said memory.

15. A plasma display device as claimed in claim 12, wherein the number of sustain emissions in said each subframe is set as a plurality of combinations in said memory, and an arbitrary one of said plurality of combinations is selected by selection signals supplied from the outside of said plasma display device.

16. A plasma display device as claimed in claim 12, wherein said plasma display device further comprises a consumed current controller for controlling and keeping the consumed current below a predetermined value, the number of sustain emissions in each subframe is set as a plurality of combinations in said memory, an arbitrary one of said plurality of combinations is selected in response to the output from said consumed current controllers and thereby the power consumption is kept constant regardless of the change of display rate.

17. A plasma display device as claimed in claim 12, wherein the information on the number of sustain emission in said each subframe is supplied from the outside of said plasma display device.

18. (AMENDED) A method of controlling [the] a gray scale of a plasma display device, wherein said method comprises the steps of:

forming a frame for an image by a plurality of subframes each having a specific weight value; and

displaying the image on said plasma display device by optionally combining gray levels of said plurality of subframes, wherein numbers of sustain emissions of each gray level are calculated so as to make a ratio of brightnesses of each gray level [is calculated so as to] substantially correspond with a ratio of [the] specific weight values of each gray level and ratio of numbers of sustain emissions of each gray level does not equal the ratio of the specific weight values of each gray level.

19. (AMENDED) A method of controlling [the] a gray scale of a plasma display device as claimed in claim 18, wherein the number of sustain emissions of said each subframe is so calculated, that [the] a sum of the squares of errors with [the] ideal values in said each gray level becomes a minimum, in order to make [the] a relation between [the] said each gray level and [the] corresponding brightness linear.

20. (AMENDED) A method of controlling [the] a gray scale of a plasma display device as claimed in claim 19, wherein [the] a brightness of one subframe of said plurality of subframes having a next larger gray level than that of another subframe of said plurality of subframes does not exceed [the] a brightness of said another subframe, for the brightness of said another subframe having said arbitrary gray level.

21. (AMENDED) A method of controlling [the] a gray scale of a plasma display device as claimed in claim 19, wherein [the] a sum of the numbers of sustain emissions of several subframes in said plurality of subframes is specified.

22. (AMENDED) A method of controlling [the] a gray scale of a plasma display device as claimed in claim 19, wherein [the] a brightness of an optional subframe is specified in said plurality of subframes.

23. (AMENDED) A method of controlling [the] a gray scale of a plasma display device as claimed in claim 18, wherein [the] a number of sustain emissions of said each subframe is so calculated, that [the] a sum of the absolute values of errors with [the] ideal values in said each gray level becomes a minimum, in order to make [the] a relation between [the] said each gray level and [the] corresponding brightness linear.

24. (AMENDED) A method of controlling [the] a gray scale of a plasma display device as claimed in claim 23, wherein [the] a brightness of one subframe of said plurality of subframes having a next larger gray level than that of another subframe of said plurality of subframes does not exceed [the] a brightness of said another subframe, for the brightness of said another subframe having said arbitrary gray level.

25. (AMENDED) A method of controlling [the] a gray scale of a plasma display device as claimed in claim 23, wherein [the] a sum of the numbers of sustain emissions of several subframes in said plurality of subframes is specified.

26. (AMENDED) A method of controlling [the] a gray scale of a plasma display device as claimed in

claim 23, wherein [the] a brightness of an optional subframe is specified in said plurality of subframes.

27. (AMENDED) A plasma display device comprising at least one pair of electrodes for carrying out a discharge operation, wherein:

said plasma display device is driven by separating address periods in which display data are written in a common period for each display line in [the] a screen[, said display data is] so as to accumulate wall charges necessary for sustain discharge from sustain discharge periods in which sustain discharge for light emission is repeated in a common period for each display line, one frame forming an image is constituted by a plurality of subframes each having a specific weight value, and an image on said plasma display device is displayed by optionally combining gray levels of said plurality of subframes, wherein numbers of sustain emissions of each gray level are calculated so as to make a ratio of brightnesses of each gray level [is calculated so as to] substantially correspond with a ratio of [the] specific weight values of each gray level, and a ratio of numbers of sustain emissions of each gray level does not equal the ratio of the specific weight values of each gray level.

28. A method of controlling a gray scale of a plasma display device, wherein said method comprises the steps of:

forming a frame for an image by a plurality of subframes having respective, predetermined brightnesses;

setting a number of sustain emissions, individually for and corresponding to the predetermined brightness of each individual subframe, different subframes bearing a non-linear relationship to the different, predetermined brightnesses of the respective, different subframes; and

displaying the image on said plasma display device in accordance with selected subframes to produce a gray scale display of a specific brightness.

29. A method of controlling a gray scale of a plasma display device as claimed in claim 28, further comprising:

setting numbers of sustain emissions for respective subframes to establish a linear relationship between respective gray levels and corresponding brightnesses of different subframes.

30. A method of controlling a gray scale of a plasma display device as claimed in claim 28, further comprising:

setting the number of sustain emissions for respective subframes in a pattern in a memory accessible by a brightness controller.

31. A method of controlling a gray scale of a plasma display device as claimed in claim 30, further comprising:

setting plural said patterns having respective, different relative brightnesses in the memory accessible by the brightness controller; and

selecting among the patterns to thereby adjust the brightness of the display of the image.

32. A method of controlling a gray scale of a plasma display device as claimed in claim 28, wherein the setting is performed by a calculation whereby the brightness obtained by one subframe of the plurality of subframes having an arbitrary brightness is twice the brightness obtained by another subframe of the plurality of subframes having a brightness next to that of the one subframe.

33. A method of controlling a gray scale of a plasma display device as claimed in claim 28, further comprising:

setting the number of sustain emissions of each subframe such that the sum of the squares of errors with ideal values in each gray level becomes a minimum and thereby to make the relation between the gray level and the corresponding brightness linear.

34. A method of controlling a gray scale of a plasma display device as claimed in claim 28, wherein the number of sustain emissions is set so that the brightness of one subframe of the plurality of subframes having a next larger gray level than that of another subframe of the plurality of subframes does not exceed the brightness of the another subframe, for the brightness of the another subframe having the arbitrary gray level.

35. A method of controlling a gray scale of a plasma display device as claimed in claim 28, further comprising:

setting the number of sustain emissions of each subframe such that the sum of the absolute values of errors with the ideal values in each gray level becomes a minimum in order to make the relation between the gray level and the corresponding brightness linear.

36. A method of controlling a gray scale of a plasma display device as claimed in claim 28, wherein the number of sustain emissions of each subframe is set in an anti-geometrical progression corresponding to the predetermined brightness of each subframe of the plurality of subframes.

37. An apparatus controlling a gray scale of a plasma display device in which a frame for an image is formed by a plurality of subframes having respective, predetermined brightnesses, comprising:

a memory having set therein a number of sustain emissions individually for, and corresponding to, the predetermined brightness of each individual subframe, different subframes bearing a non-linear relationship to the different predetermined brightnesses of the respective, different subframes; and

a controller displaying the image on said plasma display device in accordance with selected subframes to produce a gray scale display of a specific brightness.

38. The apparatus as claimed in claim 37, further comprising:

the memory having set therein numbers of sustain emissions for respective subframes to establish a linear relationship between the respective gray levels and corresponding brightnesses of the different subframes.

39. The apparatus as claimed in claim 37, further comprising:

the memory having set therein the number of sustain emissions for respective subframes in a pattern in a memory accessible by a brightness controller.

40. The apparatus as claimed in claim 39, further comprising:

the memory having set therein plural said patterns having respective, different relative brightnesses in the memory accessible by the brightness controller; and

the controller selecting among the patterns to thereby adjust the brightness of the display of the image.

41. The apparatus as claimed in claim 37, wherein the setting is performed by a calculation whereby the brightness obtained by one subframe of the plurality of subframes having an arbitrary brightness is twice the brightness obtained by another subframe of the plurality of subframes having a brightness next to that of the one subframe.

42. The apparatus as claimed in claim 37, further comprising:

the memory having set therein the number of sustain emissions of each subframe such that the sum of the squares of errors with ideal values in each gray level becomes a minimum and thereby to make the relation between the gray level and the corresponding brightness linear.

43. The apparatus as claimed in claim 37, further comprising:

the memory having set therein the number of sustain emissions so that the brightness of one subframe of the plurality of subframes having a next larger gray level than that of another subframe of the plurality of subframes does not exceed the brightness of the another subframe, for the brightness of the another subframe having the arbitrary gray level.

44. The apparatus as claimed in claim 37, further comprising:

the memory having set therein the number of sustain emissions of each subframe such that the sum of the absolute values of errors with the ideal values in each gray level becomes a minimum in order to make the relation between the gray level and the corresponding brightness linear.

45. The apparatus as claimed in claim 37, further comprising:

the memory having set therein the number of sustain emissions of each subframe is set in an anti-geometrical progression corresponding to the predetermined brightness of each subframe of the plurality of subframes.

46. A method of controlling a gray scale of a plasma display device, wherein said method comprises the steps of:

forming a frame for an image by a plurality of subframes each having a specific weight value, each of said subframes including an address period and a sustain discharge period, said address period being a common period to carry out address discharge on each selected display line so as to selectively accumulate wall charges for cells formed on said each selected display line, said sustain discharge period being a common period to carry out sustain emissions on said each selected display line, the sustain emissions on said each selected display line being carried out in said sustain discharge period;

calculating numbers of sustain emissions of said plurality of subframes so as to make a ratio of brightnesses of said plurality of subframes substantially correspond with a ratio of the specific weight values of said plurality of subframes, wherein a ratio of numbers of sustain emissions of said plurality of subframes does not equal the ratio of the specific weight values of said plurality of subframes; and

displaying the image on said plasma display device by optionally combining said subframes each having the calculated number of the sustain emissions, and thereby a brightness-drop caused in accordance with increasing the number of sustain emissions is compensated.

47. A method of controlling a gray scale of a plasma display device as claimed in claim 46, wherein the number of sustain emissions of said each subframe is so calculated, that the brightness obtained by one subframe of said plurality of subframes having an arbitrary brightness is twice the brightness obtained by another subframe of said plurality of subframes having a brightness next to that of said one subframe.

48. A plasma display device comprising at least one pair of electrodes for carrying out a discharge operation, wherein:

said plasma display device is driven by separating address periods in which display data are written in a common period for each display line in the screen so as to accumulate wall charges necessary for sustain discharge from sustain discharge periods in which sustain discharge for light emission is repeated in a common period for each display line, one frame forming an image is constituted by a plurality of subframes each having a specific weight value, numbers of sustain emissions of said plurality of subframes are calculated so as to make a ratio of brightnesses of said plurality of subframes substantially correspond with a ratio of the specific weight values of said plurality of subframes, wherein a ratio of numbers of sustain emissions of said plurality of subframes does not equal the ratio of the specific weight values of said plurality of subframes, and the image is displayed on said plasma display device by optionally combining said subframes each having the calculated number of the sustain emissions, and thereby a brightness-drop caused in accordance with increasing the number of sustain emissions is compensated.

49. A plasma display device as claimed in claim 48, wherein said plasma display device is a three-electrode plasma display device.

50. A plasma display device as claimed in claim 49, wherein said three-electrode plasma display device

is a three-electrode surface discharge AC plasma display device.

51. A plasma display device as claimed in claim 49, wherein said three-electrode plasma display device comprises:

first and second electrodes arranged in parallel with each other; and

third electrodes orthogonal to said first and second electrodes, said first electrode being commonly connected together, and said second electrodes being arranged for display lines, respectively, wherein said display device has a surface discharge structure employing wall charges as memory media.

52. A plasma display device as claimed in claim 51, wherein said three-electrode plasma display device further comprises:

a first substrate, and said first and second electrodes being arranged in parallel with each other on said first substrate and paired for respective display lines;

a second substrate spaced apart from and facing said first substrate, and said third electrodes being arranged on said second substrate away from and orthogonal to said first and second electrodes;

a wall charge accumulating dielectric layer covering the surfaces of said first and second electrodes and said first substrate;

a phosphor formed over said third electrodes and said second substrate;

a discharge gas sealed in a cavity defined between said first and second substrates; and

cells formed at intersections where said first and second electrodes cross said third electrodes.

53. A plasma display device as claimed in claim 48, wherein said plasma display device is a two-electrode plasma display device.

54. A plasma display device as claimed in claim 53, wherein said two-electrode plasma display device is a two-electrode facing-discharge AC-driven plasma display panel.

55. A plasma display device as claimed in claim 53, wherein said two-electrode plasma display device comprises:

a plurality of first electrodes; and a plurality of second electrodes orthogonal to said first electrodes, and said first electrodes being arranged for display lines, respectively wherein said display device has a surface discharge structure employing wall charges as memory media.

56. A plasma display device as claimed in claim 55, wherein said two-electrode plasma display device further comprises:

a first substrate, and said first electrodes being arranged in parallel on said first substrate;

a second substrate spaced apart from and facing said first substrate, and said second electrodes being arranged on said second substrate away from and orthogonal to said first electrodes; a wall charge accumulating dielectric layer covering the surfaces of said first electrodes and said first substrate;

a phosphor formed over said second electrodes and said second substrate; a discharge gas sealed in a cavity defined between said first and second substrates; and cells formed at intersections where said first electrodes cross said second electrodes.

57. A plasma display device as claimed in claim 48, wherein said plasma display device further comprises a memory for setting and storing the number of sustain emissions in each subframe, and information on the number of sustain emissions in said each subframe is read at any time from said memory.

58. A plasma display device as claimed in claim 57, wherein said memory is constituted by a vacant area of a driving wave-form memory device in said plasma display device, and the information on the number of sustain emissions in said each subframe is set in the vacant area of said driving wave-form memory device.

59. A plasma display device as claimed in claim 57, wherein said plasma display device further comprises a brightness controller for adjusting the brightness, and said brightness controller selects one piece from the information on the number of sustain emissions in said each subframe set in said memory.

60. A plasma display device as claimed in claim 57, wherein the number of sustain emissions in said each subframe is set as a plurality of combinations in said memory, and an arbitrary one of said plurality of combinations is selected by selection signals supplied from the outside of said plasma display device.

61. A plasma display device as claimed in claim 57, wherein said plasma display device further comprises a consumed current controller for controlling and keeping the consumed current below a predetermined value, the number of sustain emissions in said each subframe is set as a plurality of combinations in said memory, an arbitrary one of said plurality of combinations is selected in response to the output from said consumed current controllers and thereby the power consumption is kept constant regardless of the change of display rate.

62. A plasma display device as claimed in claim 57, wherein the information on the number of sustain emissions in said each subframe is supplied from the outside of said plasma display device.

63. A method of controlling a gray scale of a plasma display device, wherein said method comprises the steps of:

forming a frame for an image by a plurality of subframes each having a specific weight value, each of said subframes including an address period and a sustain discharge period, said address period being a common period to carry out address discharge on each selected display line so as to selectively accumulate wall charges for cells formed on said each selected display line, said sustain discharge period

being a common period to carry out sustain emissions on said each selected display line, the sustain emissions on said each selected display line being carried out in said sustain discharge period; and

displaying the image on said plasma display device by optionally combining gray levels of said plurality of subframes, wherein numbers of sustain emissions of each gray level are calculated so as to make a ratio of brightnesses of each gray level substantially correspond with a ratio of specific weight values of each gray level and a ratio of numbers of sustain emissions of each gray level does not equal the ratio of the specific weight values of each gray level, and thereby a brightness-drop caused in accordance with increasing the number of sustain emissions is compensated.

64. A method of controlling a gray scale of a plasma display device as claimed in claim 63, wherein the number of sustain emissions of said each subframe is so calculated, that a sum of the squares of errors with ideal values in said each gray level becomes a minimum, in order to make a relation between said each gray level and corresponding brightness linear.

65. A method of controlling a gray scale of a plasma display device as claimed in claim 64, wherein a brightness of one subframe of said plurality of subframes having a next larger gray level than that of another subframe of said plurality of subframes does not exceed a brightness of said another subframe, for the brightness of said another subframe having said arbitrary gray level.

66. A method of controlling a gray scale of a plasma display device as claimed in claim 64, wherein a sum of the numbers of sustain emissions of several subframes in said plurality of subframes is specified.

67. A method of controlling a gray scale of a plasma display device as claimed in claim 64, wherein a brightness of an optional subframe is specified in said plurality of subframes.

68. A method of controlling a gray scale of a plasma display device as claimed in claim 63, wherein a number of sustain emissions of said each subframe is so calculated, that a sum of the absolute values of errors with ideal values in said each gray level becomes a minimum, in order to make a relation between said each gray level and corresponding brightness linear.

69. A method of controlling a gray scale of a plasma display device as claimed in claim 68, wherein a brightness of one subframe of said plurality of subframes having a next larger gray level than that of another subframe of said plurality of subframes does not exceed a brightness of said another subframe, for the brightness of said another subframe having said arbitrary gray level.

70. A method of controlling a gray scale of a plasma display device as claimed in claim 68, wherein a sum of the numbers of sustain emissions of several subframes in said plurality of subframes is specified.

71. A method of controlling a gray scale of a plasma display device as claimed in claim 68, wherein a brightness of an optional subframe is specified in said plurality of subframes.

72. A plasma display device comprising at least one pair of electrodes for carrying out a discharge operation, wherein:

said plasma display device is driven by separating address periods in which display data are written in a common period for each display line in a screen so as to accumulate wall charges necessary for sustain discharge from sustain discharge periods in which sustain discharge for light emission is repeated in a common period for each display line, one frame forming an image is constituted by a plurality of subframes each having a specific weight value, and an image on said plasma display device is displayed by optionally combining gray levels of said plurality of subframes, wherein numbers of sustain emissions of each gray level are calculated so as to make a ratio of brightnesses of each gray level substantially correspond with a ratio of specific weight values of each gray level, and a ratio of numbers of sustain emissions of each gray level does not equal the ratio of specific weight values of each gray level, and thereby a brightness-drop caused in accordance with increasing the number of sustain emissions is compensated.